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FEDERAL-STATE
COOPERATIVE SNOW SURVEYS and
IRRIGATION WATER FORECASTS

for
RIO GRANDE DRAINAGE BASIN
April 1, 1949

by
Division of Irrigation Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

All information in this report was obtained by the agencies shown above in cooperation with the U.S. Forest Service,
National Park Service, State Divisions of Game and Fish, New Mexico and other Federal State and local organizations.



APRIL 1, 1949

Water Supply Outlook

Rio Grande and Canadian River Drainage Basins

The water supply outlook for irrigated areas served by the Rio Grande and its tributaries in San Luis Valley was well above normal as shown by April 1 snow surveys. Most of the snow courses have the highest snow-water content recorded for this date since snow surveys were started in 1937. Along the Sangre de Cristo Range to the east of the Valley snow cover is slightly above normal. Recent precipitation in the Valley has been about normal and soil moisture conditions are fair to good. On the headwaters of the Pecos and Rio Grande tributaries to the east of the river in New Mexico summer runoff will be normal or slightly below. Snow cover on the Canadian River tributaries is about normal and somewhat less than a year ago.

RIO GRANDE

Snow accumulation along the Continental Divide to the west of San Luis Valley is very high and generally greater than for any April 1 snow survey since the program was started in 1937. The current average snow-water contents are slightly higher than for April 1, 1941. Total runoff on the Rio Grande, Alamosa and Conejos Rivers is expected to be about the same as for 1941 and for the Rio Grande at Del Norte slightly more than for the 1948 season. Peak flow of these streams is also expected to be high, but the rate will be materially affected by April snow accumulation and temperatures at melting time. Snow surveys will be made on April 15 and May 1 to check these probabilities. Based on current data there is about an even chance that peak flow in the Rio Grande will exceed the 1941 peak, and about one chance in five that the 1948 peak will be exceeded. On the Alamosa and Conejos Rivers there is about a 2 to 1 chance that 1949 peak flows will be greater than for 1941. Reservoir storage on the valley streams is about the same as a year ago. Soil moisture in the valley area has been dry during the winter but was substantially improved during the storm about April 1.

Snow conditions along the Upper Rio Chama are similar to the Rio Grande. The flow of the river into El Vado reservoir is expected to be slightly less than for 1941. Peak flow of the stream past the Park View gaging station has an even chance of exceeding 1941. El Vado Reservoir has been drained down to 19,000 acre feet and should be able to control peak flows below the reservoir. For the Rio Grande at Otowi Bridge the April-September

flow is expected to be about 1,500,000 acre feet. Peak flow at this point for next season has only once chance in five of exceeding 1941. The most probable peak flow, based on current data, is about 18,000 second-feet, but past records have indicated that it may vary 30 percent above and below this figure.

Snow cover is normal or less on the tributaries to the Rio Grande east of the River in Northern New Mexico. Soil moisture conditions are described as good to excellent in the Albuquerque area. Stream flow is above normal.

The combined storage in Elephant Butte and Caballo Reservoirs is now 689,000 acre feet as compared to 566,000 on April 1, 1948. There should be a substantial increase in storage this season. Soil moisture conditions in the lower Rio Grande Valley are reported as only fair due to recent precipitation deficiency.

On the headwaters of the Pecos River snow cover is rather light, much less than a year ago. However, due to early winter snow, summer runoff should be only slightly under normal. Soil moisture conditions on the Carlsbad project are reported as good.

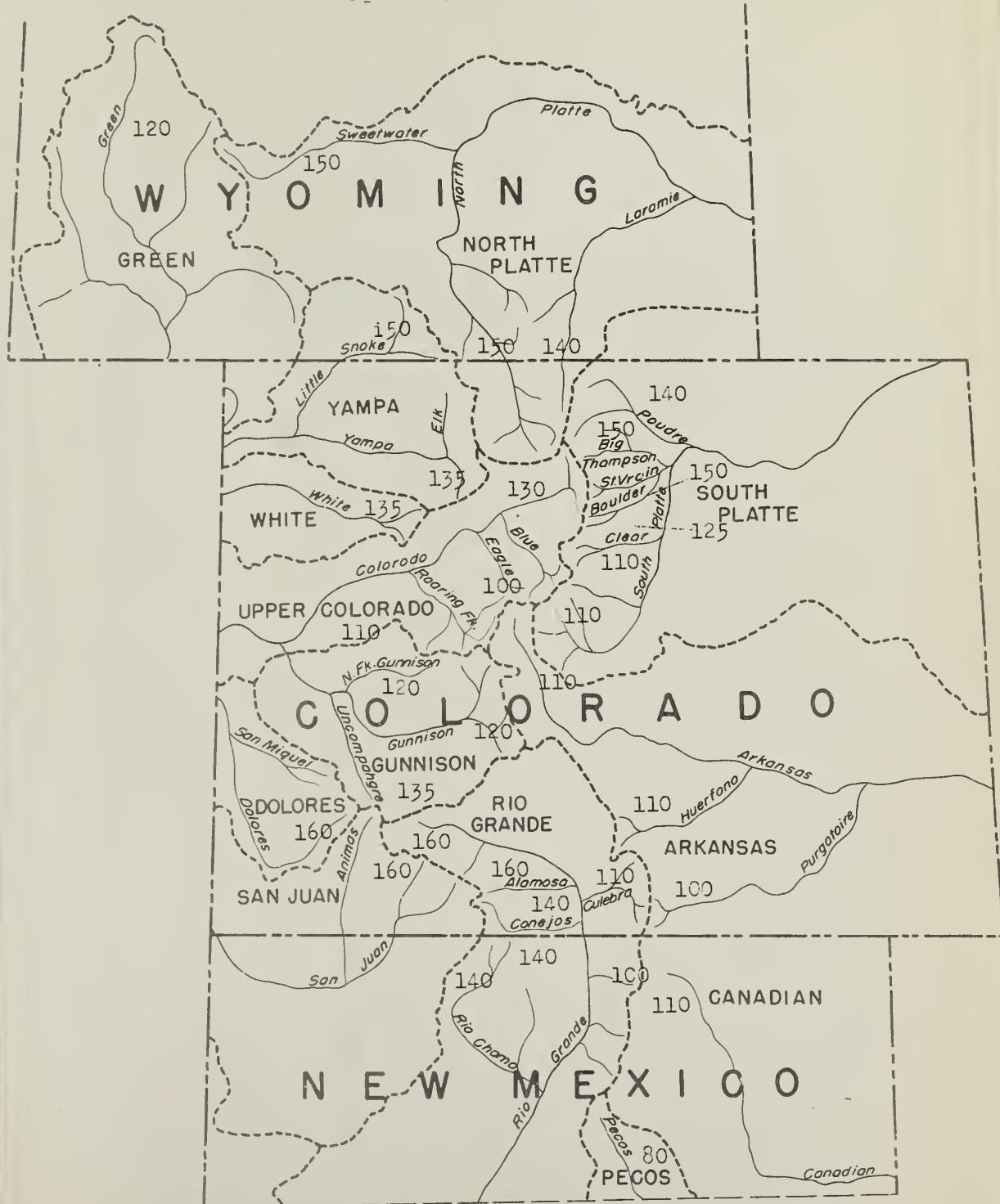
CANADIAN RIVER

On the tributaries to the Canadian River the snow-water content is ten percent above normal but somewhat less than a year ago. Conchas reservoir has in storage 306,500 acre-feet as compared to 371,000 a year ago.

Recent precipitation on the Tucumcari Project area has been much above normal. Soil moisture range and crop conditions are described as excellent.

WATER CONTENT OF SNOW ON THE WATERSHEDS OF
PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS
BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

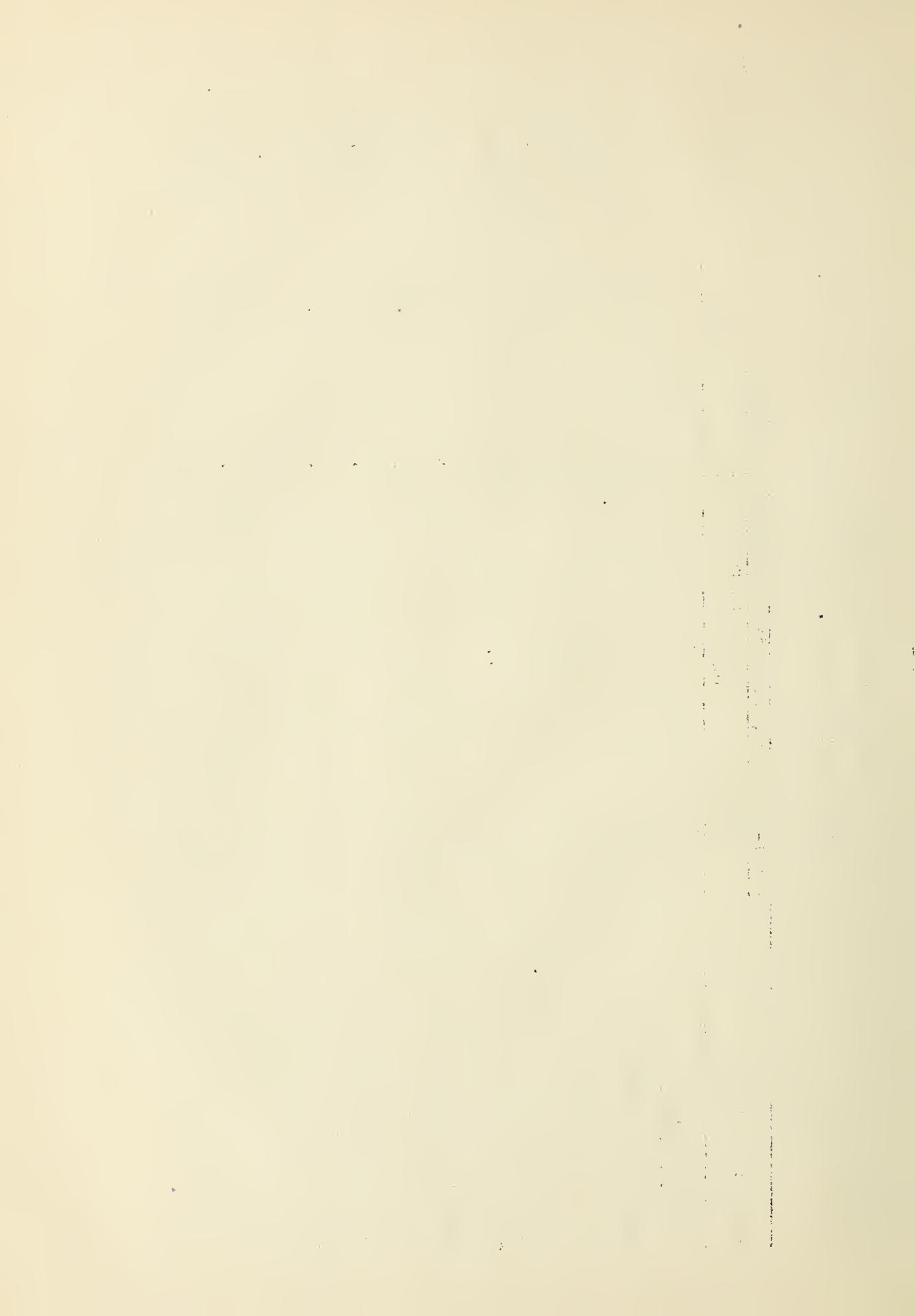
In Percent of Normal
April 1, 1949



RIO GRANDE DRAINAGE BASIN

STREAM FLOW FORECASTS, April 1, 1949

Basin and Stream	April-September, inclusive, Streamflow Acre Feet			10-year avg. 1938-1947
	Forecast 1949	Measured Runoff 1948	1947	
RIO GRANDE				
South Fork at South Fork	180,000		104,000	132,000
Rio Grande at Del Norte	850,000	823,000	530,000	347,000
Alamosa above Terrace Res.	115,000		68,000	40,000
Conejos at Liogote	350,000	262,000	176,000	124,000
Culebra at San Luis	40,000		43,000	16,000
Chama at Park View	375,000		148,000	79,000
Taos at Los Cordovas	15,000		21,000	5,000
Embudo Creek at Dixon	65,000		27,000	18,000
Rio Grande at Otowi Bridge	1,500,000	987,000	422,000	204,000
Rio Grande at San Marcial	1,200,000	727,000	180,000	58,000
Pecos at Pecos	65,000		38,000	25,000



SNOW SURVEYS AND IRRIGATION WATER FORECASTS
RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, APRIL 1, 1949

STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	THOUSANDS OF ACRE FEET IN STORAGE				10-Year Ave. 1938-47
			1949	April 1 1948	1947	1946	
RIO GRANDE	Rio Grande	51.1	19.5	24.2	6.9	6.4	16.3
	Santa Maria	43.5	15.8	5.7	5.5	7.5	9.9
	Sanchez	103.0	6.2	9.2	6.7	13.1	16.6
	Terrace	17.7	2.2	6.0	3.6	2.2	3.8
	Continental	26.7	6.0	—	1.2	7.6	6.8
	Elephant Butte	2273.7	530.0	394.1	512.3	1029.9	1139.7
	Caballito	365.0	158.9	171.5	262.8	247.9	183.2
	El Vado	226.0	19.0	26.8	41.0	95.6	61.9
	Canadian River	600.0	306.5	371.0	364.9	311.5	248.3
	Conchas						
PECOS RIVER	Alamogordo	148.0	35.6	35.6	40.0	59.3	
	McMillan-Avalon	45.1	6.0	4.7	5.0	20.8	

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for

RIO GRANDE BASIN
April 1, 1949

SUMMARY OF APRIL 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY
WATERSHEDS

WATERSHEDS	Snow Depth				Water Content				Number of Courses in Average				Snow Density				1949 Water Content in percent of	
	Twelve year Avg.*		1948	1949	Twelve year Avg.*		1948	1949	Twelve year Avg.		1948	1949	Percent		1949	Twelve Year Avg.*	1949	percent
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	Percent	Percent	Percent	Percent	percent	percent
Rio Grande(Colo.)	34.0	46.4	45.0	11.8	14.1	14.4	9	35	31	32	122	102						
Upper Rio Grande	40.3	59.8	60.8	13.3	20.8	21.1	3	33	35	35	159	102						
Alamosa River	43.4	--	57.9	12.8	--	20.0	2	30	33	35	157	--						
Conejos River	52.3	--	61.5	17.3	--	20.9	3	33	31	34	121	--						
Culebra River	35.5	41.3	50.1	10.9	13.7	13.0	1	31	33	26	119	95						
Rio Grande(N.M.)	22.9	33.8	27.8	7.5	10.6	8.9	13	33	31	32	119	84						
Chama River	35.7	39.9	44.8	12.5	13.2	16.0	5	35	35	36	128	115						
Pecos River	13.5	26.7	10.3	4.2	7.6	3.1	3	31	28	30	74	41						
Canadian River	22.5	36.7	26.4	7.0	10.5	7.7	4	31	29	29	110	73						

*Some for shorter periods

P R E C I P I T A T I O N D A T A

WATERSHED	STATE	Precipitation October 1 to March 31		Departure from Normal		Precipitation March		Departure from Normal	
		Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Canadian	New Mexico	4.42	-0.08	0.80	0.80	0.46	-0.10	-0.10	-0.10
Rio Grande	Colorado	2.64	-0.80	0.46	0.46	1.07	-0.17	-0.17	-0.17
Rio Grande (N)	New Mexico	6.44	-0.16	1.07	1.07	0.26	-0.44	-0.44	-0.44
Rio Grande (S)	New Mexico	2.82	-0.43	0.26	0.26	0.49	-0.22	-0.22	-0.22
Pecos	New Mexico	4.33	-0.08	0.49	0.49	0.49	-0.28	-0.28	-0.28

*March precipitation tentative

RIO GRANDE DRAINAGE SNOW SURVEYS
April $\frac{1}{2}$, 1949

April 1, 1979

Drainage Basin and Snow Course	No. and State	Location						Snow Cover Measurements			
		Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Yrs. of Rec.	Past Record	
RIO GRANDE IN COLORADO											
Wolf Creek Pass	26 Colo.	4	37 N	2E	10000	3/31	106.5	39.3	20.7	13	29.7
Upper Rio Grande	27 "	13	40 N	4W	9350	3/28	45.3	14.3	4.7	13	6.2
Silver Lakes	47 "	15	36 N	5E	9600	3/31	31.7	10.3	3.2	12	5.9
River Springs	49 "	25	33 N	6E	9300	4/1	31.2	10.6	4.2	12	7.1
Laveta Pass #2	74 "	22	28 S	7W	9300	3/31	30.5	9.4	8.2	13	8.3
Summitville	76 "	30	37 N	4E	11500	4/1	84.1	29.5	18.2	19.8
Cumbres Pass #2	77 "	17	32 N	5E	10000	3/31	69.3	22.7	21.6	15.2	25.2
Santa Maria	80 "	8	41 N	2W	9700	3/30	30.5	9.6	8.0	2.0	4.1
Culebra	82 "		37, 2N	105.2W	10000	3/31	50.1	13.0	13.7	11.4	10.9
Ft. Garland	84 "	13	29 N	72W	8200	4/3	9.8	1.9	5.0	0.0	3.2
Stunner Pass	107 "	16	36 N	4W	10550	4/2	78.2	28.3			
Platoro	108 "	22	36 N	4W	9950	4/2	42.5	15.9			
West Conejos	109 "	25	35 N	4E	9450	4/2	74.1	28.9			
La Manga	110 "	24	32 N	5E	10100	3/31	51.3	17.2			
Pyramid	122 "	26	41 N	5W	10300	4/6	55.3	18.3			
Spr. Creek Pass	123 "	2	42 N	3W	10900	4/5	42.3	12.4			
Pool Table Mtn.	124 "	19	41 N	2E	10000		47.6	14.5			
Lake Humphreys	125 "	32	40 N	1E	9300		33.3	8.3			
Cochetopa Pass	126 "	12	45 N	3E	10000	3/31	45.0	14.4			
UPPER RIO GRANDE			Average for drainage				14.1	7.7			
Wolf Creek Pass	26 Colo.	4	37 N	2E	10000	3/31	106.5	42.3	39.3	20.7	29.7
Upper Rio Grande	27 "	13	40 N	4W	9350	3/28	45.3	14.3	11.9	13	6.2
Santa Maria	80 "	8	41 N	2E	9700	3/30	30.5	9.6	8.0	2.0	4.1
Pyramid	122 "	26	41 N	5W	10300	4/6	51.3	17.2	18.8	12.4	14.5
Spr. Creek Pass	123 "	2	42 N	3W	10900	4/5	55.3	14.3	42.3	12.4	21.0
Pool Table Mtn.	124 "	19	41 N	2E	10000		47.6	14.5	47.6	14.5	21.0
Lake Humphreys	125 "	32	40 N	1E	9300		33.3	8.3	60.8	20.8	21.0

RIO GRANDE DRAINAGE SNOW SURVEYS
April 1, 1949

Drainage Basin and Snow Course	No. and State	Location				Snow Cover Measurements			
		Sec.	Twp. or Lat.	Range or Long.	Elev.	Date Survey	Snow Depth (Inches)	Water Content (Inches)	Yrs. of Rec.
ALAMOSA RIVER	47 Colo. 76 "	15 30	36N 37N	5E 4E	9600 11500	3/30 4/1	31.7 84.1 57.9	10.4 29.5 20.0	3.2 18.2 10.7
Silver Lakes Summitville	76 Colo.	15 30	Average for drainage						5.9 19.8 12.8
CONEJOS RIVER	49 Colo. 76 "	25 30	33N 37N 32N	6E 4E 5E	9300 11500 10000	4/1 4/1 3/31	31.2 84.1 69.3	9.7 29.5 22.7	4.2 18.2 15.2
River Springs	76 "	17	36N	4W	9950	4/2	78.2	21.6	12
Summitville*	77 "	22	35N	4E	8450	4/2	42.5	28.3	13
Cumbres Pass #2	108 "	25	32N	5E	10100	3/31	74.1	15.9	25.2
Platoro	109 "	24	Average for drainage						17.3
West Conejos	110 "								
La Plata									
CULEBRA RIVER	82 Colo.	37.2N	105.2W	10000	3/31	50.1	13.0	13.7	11.4
Culebra									9
RIO GRANDE IN NEW MEXICO									
CHAMA RIVER	77 Colo. 6 N.M.	17 4	32N 26N	5E 6E	10000 9500	3/31 4/1	69.3 32.8	22.7 14.0	15.2 15.1
Cumbres Pass #2	15 "	16	28N	7E	9700	3/30	42.9	14.8	18.0
Canjilon	17 "	18	36.9N 36.9N	106.7W 106.7W	7750 8500	4/3 4/3	32.0 47.1	13.2 15.1	5.4 5.2
Payrole	"								9
Chama Divide									0.0
Chamita									2.8
									8.6
									12.6
									13.9
									8.6
									12.5

*On adjacent drainage

RIO GRANDE DRAINAGE SNOW SURVEYS
April 1, 1949

Drainage Basin and Snow Course	No. and State	Location				Snow Cover Measurements				Past Record
		Sec.	Twp. or Lat.	Range or Long.	Elev.	Date of Survey	Snow depth (inches)	Water Content (Inches)	Years of Rec.	
Red River	1 N.M.	29	28N	15E	9500	3/31	26.9	8.9	6.3	12
Taos Canyon	2 "	10	25N	15E	9000	4/1	12.7	3.2	9.0	8.7
Aspen Grove	4 "	12	18N	10E	9100	3/31	5.6	1.8	7.3	6.9
Lee Ranch	5 "	3	18N	4E	9050	4/1	43.3	9.9	13.4	3.9
Canjilon	6 "	4	26N	6E	9500	4/1	32.8	14.0	15.1	7.9
Hematite Park*	7 "	8	28N	15E	9500	4/1	20.2	5.7	9.5	16.4
Tres Ritos	12 "	23	22N	13E	9000	4/1	25.2	7.1	9.3	5.7
Pay Role	15 "	16	28N	7E	9700	3/30	42.9	14.8	15.1	5.5
Chama Divide	17 "		36.9N	106.7W	7750	4/3	32.0	13.2	5.2	9.4
Chamita	18 "		36.9N	106.7W	8500	4/3	47.1	15.1	12.6	2.8
Cordova	19 "	22	22N	13E	10100	4/1	46.8	14.2	4.2	8.6
Panchuela #2	20 "	27	19N	12E	8300	4/1	8.5	2.4	9.3	13.0
Big Tesuque	21 "	17	18N	11E	10000	3/31	16.9	5.2	4.8	2.2
Elk Cabin	24 "	8	18N	11E	8250	4/1	10.6	2.2	0.3	6.6
Average for drainage							27.8	8.9	10.6	1
<hr/>										
PECOS RIVER	4 N.M.	12	18N	10E	9100	3/31	5.6	1.8	7.3	3.9
Aspen Grove*	20 "	27	19N	12E	8300	4/1	8.5	2.4	4.8	2.2
Panchuela #2	21 "	17	18N	11E	10000	3/31	16.9	5.2	10.7	6.6
Big Tesuque	25 "	31	18N	11E	8700	3/31	4.0	1.2	3.9	5.5
Gallinas			Average for drainage				10.3	3.1	0.6	4.2
<hr/>										
Hematite Park	9 N.M.	8	28N	15E	9500	4/1	20.2	5.7	9.5	5.7
Ocate Mesa	10 "	25	24N	16E	9200	4/1	13.4	3.8	7.9	3.9
Tres Ritos*	12 "	23	22N	13E	9000	4/1	25.2	7.1	9.3	5.5
Cordova*	19 "	22	22N	13E	10100	4/1	46.8	14.2	15.2	13.0
Average for drainage							26.4	7.7	10.5	7.0

*On adjacent drainage

The following organizations cooperate in the crop culture and irrigation water supply interests of the Colorado, Missouri and Rio Grande basins inasmuch as their activities affect the welfare of agriculture.

STATE

Colorado State Engineer
Colorado State Geologist
State Water Engineer
The State Water Board
State Water Engineer
State Water Board
Colorado Department of Agriculture
Colorado Department of Revenue
Colorado Department of Health
State Department of Health

MUNICIPAL

Department of Agriculture
Bureau of Mines
U.S. Soil Conservation Service
Department of Interior
Bureau of Reclamation
Mississippi River
Missouri River
Department of Health
Health Commissioner
State Highway Corps
State Utilities
Colorado State Service Agency
Western Colorado Power Company
Western Power Company
Public Service Company of New Mexico
Dynamite and Explosives Division of the Company

INDUSTRIAL

City of Denver
City of Greeley
City of Boulder

AGRICULTURAL ORGANIZATIONS

Colorado Valley Water Users' Association
Arkansas Valley Water Association
Colorado River Water Conservation District
El Paso County

IRRIGATION DISTRICTS

Denver Irrigation and Irrigation Company
The Blue River Irrigation District
Rocky Mountain Irrigation Company
Laramie Land Company
Rocky Flats Valley Water Users' Association
Weld County Irrigation Company
Garden Irrigation District
Larimer County
Clear Creek Irrigation District
High Alpine Valley Water Users' Association
San Juan Irrigation and Storage District
New Mexico Irrigation and Canal Company

Any other organization and individual furnish valuable information for the agricultural interests. Their cooperation is greatly appreciated.

